Decline in serum cholinesterase activities predicts 2-year major adverse cardiac events.

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Abstract:

Parasympathetic activity influences long-term outcome in patients with cardiovascular disease, but the underlying mechanism(s) linking parasympathetic activity and the occurrence of major adverse cardiovascular events (MACEs) are incompletely understood. The aim of this pilot study was to evaluate the association between serum cholinesterase activities as parasympathetic biomarkers and the risk for the occurrence of MACEs. Cholinergic status was determined by measuring the cumulative capacity of serum acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) to hydrolyze the AChE substrate acetylthiocholine. Cholinergic status was evaluated in randomly selected patients undergoing cardiac catheterization. The patients were divided into two groups of 100 patients in each group, with or without occurrence of MACEs during a follow-up period of 40 months. Cox regression models adjusted for potential clinical, metabolic and inflammatory confounders served to evaluate association with clinical outcome. We found that patients with MACE presented lower cholinergic status and AChE values at catheterization (1,127 ± 422 and 359 ± 153 nmol substrate hydrolyzed per minute per milliliter, respectively) than no-MACE patients (1,760 ± 546 and 508 ± 183 nmol substrate hydrolyzed per minute per milliliter, p < 0.001 and p < 0.001, respectively), whose levels were comparable to those of matched healthy controls (1,622 ± 303 and 504 ± 126 nmol substrate hydrolyzed per minute per milliliter, respectively). In a multivariate analysis, patients with AChE or total cholinergic status values below median showed conspicuously elevated risk for MACE (hazard ratio 1.85 [95% confidence interval [CI] 1.09-3.15, p = 0.02] and 2.21 [95% CI 1.22-4.00, p = 0.009]) compared with those above median, even after adjusting for potential confounders. We conclude that parasympathetic dysfunction expressed as reduced serum AChE and AChE activities in patients compared to healthy controls can together reflect impaired parasympathetic activity. This impairment predicts the risk of MACE up to 40 months in such patients. Monitoring these parasympathetic parameters might help in the risk stratification of patients with cardiovascular disease.

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